Transmission
Cause of Mortality
Treatment/Control/Containment
Diagnostics
Survey/Monitoring
Geomyces
Captive Management/Rehab
Population Effects
Data Management
Other

Title	Principal Investigator(s)	Date Initiated	Expected Completion Date	Funding Amount	Funding Source	Project Description
Testing the transmission of WNS from hibernacula to the little brown bat	Hicks/Darling	Oct. 09		$2,000	FWS(RO)	To determine if little brown bats can get WNS from the cave environment.
A study of bat-to-bat transmission of WNS	Blehert	Jan-09			USGS/FWS (PE)/other	Laboratory bat-to-bat infection study.
Summer transmission study	Okoniewski					To determine whether *G. destructans* persists in the summer and is detectable using various techniques.
WNS fungal sampling at "rest stop caves" in Alabama	Gates	late winter '10				To increase our understanding of *G. destructans* being spread by humans.
Changes in body composition and immune responses in pre-hibernating and hibernating little brown myotis affected and	Kunz/Reichard	Jun-09	Dec-09	$10,000	FWS(PE)	

unaffected by WNS						
Assessing immune competence in bats naturally affected by WNS and in bats artificially infected by the suspected WNS pathogen	Reeder	Jan-09	Sep-09	$68,687	FWS(PE)	
Histopathological and microbiological evaluation of Chiropteran wing membranes for fungal induced damage	Buckles	Jan-09	Sep-10	$20,790	FWS(PE)	
Immune function, body composition and genetic correlates of bat WNS	Kunz/Sorenson	Nov-09	Sep-11	$105,000	FWS(PE)	Describe differences in immune function between affected and unaffected bats.
Non-invasive surveillance of bat hibernacula to investigate potential behavioral causes of mortality associated with WNS	Cryan/Castle	Sep-09	Dec-12	$90,000	USGS/SSP/NPS	
Demonstrating a Causal Link Between a *Geomyces* spp. Fungus and White-Nose Syndrome in Little Brown Myotis (*Myotis lucifugus*)	Blehert	2009	ongoing	$4,582	BCI	Donation to support lab research - NOT a grant.
Environmental contaminants and WNS	Secord			$314,900	FWS(EC)	
Measuring cytokine profiles in hibernating *Myotis lucifugus* affected by WNS: assessment of	Kunz/Moore	Jan-10	Dec-10	$11,591	NSS	

immunocompetence levels in bats affected versus unaffected bats						
Death by starvation: An hypothesis-based investigation of WNS in the little brown myotis	Kunz	Jul-08	Sep-10	$14,000	NSS (there are others)	Analyses of body composition and dietary composition of bats and the biomass and quality of insects available to little browns during pre-hibernation period.
White-nose Syndrome in Bats: Death by Starvation	Kunz	2009	ongoing	$28,800	BCI	
The potential role of dietary alpha-linolenic acid in WNS	Frank/Hicks/Kunz/ Rudd			n/a	NSF	
Winter energetics of little brown bats with WNS	Tomasi/Janicki	Sep-08	Summer 09	$2,200	NSS, BCI and MO State	Quantify the torpid metabolic rates of hibernating little brown bats to explore energetic changes associated with WNS
Winter energetics of little brown bats with WNS	Tomasi	2009	ongoing	$6,600	BCI	Quantify the torpid metabolic rates of hibernating little brown bats to explore energetic changes associated with WNS
Are hibernating bats affected with WNS immunocompromised?	Moore/Kunz	Nov-08	9-Sep	$6,133	NSS (there are others)	Field-based study to assess various aspects of relative immune function
Are Hibernating Bats Affected with WNS immunocompromised?	Moore/Kunz	2009	ongoing	$6,404	BCI	Field-based study to assess various aspects of relative immune function
The potential role of dietary alpha-linolenic	Frank/Hicks/Kunz/ Rudd			n/a	NSF	

acid in WNS						
Hibernation arousal patterns in WNS and unaffected bats; a report of the RCN grant	Reeder/Frank					Use dataloggers on WNS affected and unaffected bats to monitor arousal patterns.
Studying immune competence in "healthy" bats and bats affected by WNS.	Reeder	2009	ongoing	$5,883	BCI	
Importance of insect chitin as an energy source for bats	Dannelly/Chamberlain/Whitaker	Fall 2008		$3,000	BCI	1) Determine the significance of chitin utilization as a source of energy for hibernating bats. 2) Determine the bacterial flora present in WNS affected bats with emphasis on the makeup or lack of chitinase producing bacteria.
Behavior of bats affected by WNS	Brownlee	Nov-10	Oct-10	$6,950	NSS	To observe WNS bats in natural hibernacula and in captivity using digital video recorders. To use acoustic equipment to determine if bats are echolocating while hibernating.
Fungal digestion of Chiropteran integument	Pannkuk	Jan-10	Summer 10	$5,800	NSS	Quantify the amount of mechanical damage over time caused to bat integument by *G. destructans*.
Field testing topical applications of terbinafine for the control of WNS in hibernating bats	Hicks	Dec-09		n/a	n/a	To test if anti-fungal terbinafine is effective in controlling the spread of *G. destructans* and reduce WNS related mortality.

Can artificial thermal refugia reduce mortality associated with WNS?	Craig/Boyles	Dec-08	May-09	$28,081	FWS(PE)	
The propagation and decontamination of WNS in the environment	Barton/Keel	Nov-09	Sep-11	$155,355	FWS(PE)	1) Determine methods of killing or inhibiting the growth of *G destructans.* 2) Identify a culture media that allows for the more rapid growth of *G. destructans* and other *Geomyces* spp.
Investigation of treatment and control strategies of WNS in wild bats	Blehert/Wright	Oct-09	Sep-12	$100,000	USGS/SSP	
Decontamination issues and the natural history of *Geomyces* species in cave environments	Barton	Spring 09	Dec-09	$2,500	NSS	Provides funds for travel and laboratory supplies.
Identification and evaluation of potential biological control agents towards *Geomyces destructans*	Amelon/Knudsen,			$10,000	FWS(PE)	To obtain representative isolates of skin bacteria and fungi from selected bat species, and to screen them for antagonistic activity towards *G. destructans*
Generation of *G. destructans* specific monoclonal antibodies	Akiyoshi/Robbins	Nov-09	Nov-10	$113,055	FWS(PE)	Generation and characterization of monoclonal antibodies against *G destructans* to help develop rapid diagnostic tools.

miRNA profiles of little brown bat physiological condition and health	Iwanowicz/King	Oct-09	Sep-10	$63,938	FWS(PE)	Development and validation of miRNA profiles as suitable biomarkers of little brown bat physiological condition and health. WNS affected and healthy bats will be compared to identify diagnostic profiles that may be used to predict at risk populations prior to the manifestation of clinical evidence of WNS.
Development of a fluorescent in situ hybridization probe for *G.destructans*	Blehert	Sep-08		$30,000	FWS(DD)/USGS	The probe will be used to positively identify the fungal hyphae observed to invade muzzle, ear, and wing skin of white-nose syndrome affected bats.
Hibernacula and post-hibernacula surveillance in Virginia for identifying WNS	Reynolds	Dec-08	Sep-09	$15,000	FWS(PE)	
Regional surveillance of WNS	Darling	Mar-09	Dec-09	$30,000	FWS(DD)	Track spread and effects of WNS in VT, NH, and MA, participate in research conducted in New England, collect sample material for genetic or lab analyses, respond to public inquiries and document and track unusual bat sightings. Report completed on winter hibernacula surveys, summer trapping and participation in other field activities.

Distribution of WNS on the Finger Lakes National Forest (NY) and WNS outreach	Smith			$15,400	USFS and GLRI	Acoustic surveys (mobile and stationary) and mist netting will be conducted to compare pre- and post- WNS bat activity on the Finger Lakes National Forest, an area noted to have high Myotis use during 2009 NYSDEC surveys. Swab samples of fur/skin will be collected on all captured bats to determine the percentage of bats with WNS and to assess the distribution of *Geomyces destructans*. on the National Forest. A 3-D interactive display that showcases bat ecology will also be developed and shared with other agencies for enhanced outreach efforts.
WNS acoustic monitoring project at Grandpa's Knob, Rutland County, Vermont	Stantec/Darling	July?-2009	Mar-10	$18,500	Stantec contributed equipment, energy company contributed proprietary information (i.e. previous acoustic data). FWS(PE)	Repeat acoustic surveys conducted for proposed wind farm in Lake Champlain area of VT to determine whether a trend can be detected as a result of elevated mortality levels due to WNS in VT and NY hibernacula.
A novel batcam for censusing maternity colonies of bats in regions affected by WNS	Kunz	2009	ongoing	$5,000	BCI	

A proposal to design an automated bat counter	Herzog/Hicks	2009	ongoing	$5,000	BCI	
Fall swarm monitoring and tracking of Virginia bats affected by WNS	Reynolds/Orndorff	Aug-09	Apr-10	$7,500	NSS	Capture, assess, and band bats at both WNS positive and negative locations. Band bats to facilitate tracking of WNS in individuals. Surveillance of bats at WNS positive and negative sties in Virginia.
Development of a template for Region 3 States to use in WNS planning			Dec-09	$22,609	FWS(PE)	Assist R3 States in WNS planning
Geographic distribution of the psychrophilic fungus (*Geomyces* sp.) associated with WNS.	Blehert	Jun-09	Jun-10	$80,904 (NSS funded $5,000)	FWS(PE)/NSS/USGS	Document the geographic distribution of *G. destructans* in cave sediments.
Geomyces destructans genome sequencing project	Blehert				Broad Institute, MIT with support from USGS and NHGRI	
Molecular epidemiology of *G. destructans* in U.S. and Europe	Blehert					
Establishing a security population of the Virginia big-eared bat at the Smithsonian's National Zoological Park	Songsasen/Wildt	Nov-09	Nov-11	$322,652	FWS(PE)	Determine the feasibility of establishing a population of Virginia big-eared bats in captivity.
Experimental treatment of captive WNS-affected little brown bats with vinegar wash	Kershmer/Valent	May-09	Aug-09	n/a	FWS(PFFW)	Determine whether vinegar wash treatment or simple rehabilitative care will "cure" WNS affected bats.

Baseline data relevant to the WNS crisis: Analysis of survival, fecundity and colony population trends of *Myotis lucifugus* in the northeastern US for the past 15 years	Frick/Pollack/Reynolds/Kunz	Jan-09	Sep-09	$89,500	FWS(PE)	
Assessing the impact of WNS on the genetic viability of Indiana bats	Amelon/Knudsen,	Nov-09	Jan-11	$40,000	FWS(PE)	1) Model population structure for lbats to predict migration pathways, genetic loss, and risk of extinction. 2) Compare genetic info of affected and non-affected individuals.
Acoustic monitoring of bat populations	Herzog/Britzke	Jun-09	ongoing		FWS/DoD/states/volunteer	Conduct long-term acoustic transects to evaluate changes in species composition and relative abundance.
New England data resurvey, Green Mountain (VT) and White Mountain (NH) National Forests	Hoelscher			$14,000	USFS	Forty sites previously surveyed during 1995 and 2007 will be resurveyed using stationary acoustic recording devices to determine changes in bat populations on the local level and to add to the datasets for changes in bat populations in the Northeast.
Maternity season acoustic surveys on 14 Eastern Region National Forests and the Midewin National Tallgrass	Ewing	Summer 2010	Summer 2010	$93,000	USFS	Continues the collection and analysis of baseline summer population data for forest bat species across a broad geographic area, in partnership with the U.S. Army Corps of Engineers, Engineer Research and Development Center. A

						minimum of 56 transects are scheduled to be surveyed three times during summer 2010.
Assessment of bat activity in Luzerne County, PA after WNS	Whidden/Turner/ Williams	Apr-10	Mar-10	$6,904	NSS	Acoustic monitoring at a wind mill site. Comparison of data pre-WNS and post-WNS.
Resurvey of northern long-eared bat roosts, White Mountain National Forest (NH)	Prout			$7,000	USFS	Northern long-eared bat (NLEB) roosts (including maternity roosts) at 20 sites on the White Mountain National Forest will be relocated 15 years post-initial survey; the project will provide information to the USFWS for the NLEB listing petition and will document characteristics and longevity of these roost trees, as well as changes in bat use.
Summer maternity bat colony monitoring - emergence counts and/or trapping surveys	Butchkoski, Duchamp	Jun-09	ongoing		Competetive SWG, volunteers, FWS, States	Conduct long-term maternity colony monitoring to investigate presence and health of, and effects of WNS on, summer maternity colonies. PA coordinating regional database and volunteer hours to use as match for SWG.

Population demographic models for the conservation of endangered Indiana bats at risk to WNS	Thogmartin	Nov-09	Oct-10	$194,409	FWS/USGS	Allow the Service to be able to predict the consequences of alternative actions for the persistence and recovery of the Indiana bat, particularly in light of ongoing mortality due to WNS
Submission of Myotis bats to rabies labs	Whitaker/ISU Center for North American Bat Research and Conservation	Jun-05				Greatly increased numbers of Myotis bats were submitted in winter to the New York rabies lab during WNS. Such increases could give an early warning to other states. The ISU center for North American Bat Research and Conservation is attempting to collect rabies information from other states, and if they are not presently identifying the bats, we are trying to stimulate them to do so. We will try to help them find someone in their state to do this.
Information on weights of bats during hibernation period	Whitaker/ISU Center for North American Bat Research and Conservation	Fall 2008	Spring 2009	$62,972	IDNR	Data on weights of hibernating bats was found to be generally few. Therefore in fall, spring, and winter, data was collected from Wyandotte Cave, Rays Cave, and Copperhead Cave (actually an abandoned coal mine), all in Indiana.

Effects of WNS on hibernating bat populations: applications of stochastic mathematical models	Hallam/McCracken			$115,000	FWS(PE)	The priorities of the research will be development of a suite of models that 1) project dispersion of the fungal pathogen, 2) determine WNS effects on the life history stages of maternity and prehibernation that relate to starvation and dehydration during hibernation, and 3) investigate biological and chemical controls on the system that can be imposed to assuage WNS disease spread and modulate effects such as high rates of mortality.
WNS specimen tracking system	Cryan/Everette	Oct-09	Sep-11	$50,000	USGS/QRP	The USGS Fort Collins Science Center (FORT) will provide technical assistance to the USFWS Region 5 to construct a geospatially oriented data support system for tracking information on WNS specimens (e.g., carcasses, tissues), from collection through analysis.
Hibernacula microclimate and WNS susceptibility	Grieneisen	Nov-09	Oct-10	$6,440	NSS	To examine the relationship between hibernacula microclimate and progression of the disease in WNS-affected bats. To determine the impact that temperature has on the progression of WNS. To determine the microclimate preferences in WNS-affected and unaffected bats.

Protection of Federal and State threatened and endangered bat winter roosting sites from unauthorized public access on the Shawnee National Forest (IL)	McClanahan			$10,000	USFS	A bat-friendly gate will be constructed across the sole entrance to Dutchman's Cave, located in Johnson County. The public has continued to ignore closure order signs posted at Dutchman's Cave and a gate offers a permanent solution for protecting hibernating bats. Dutchman's Cave offers suitable habitat for the endangered Indiana bat and gray bat, and Regional Forester Sensitive eastern small-footed bat.
WNS Investigation and Response - Competitive State Wildlife Grants program	Williams	2009	ongoing	$10,000	BCI	